



NATIONAL ISSUE

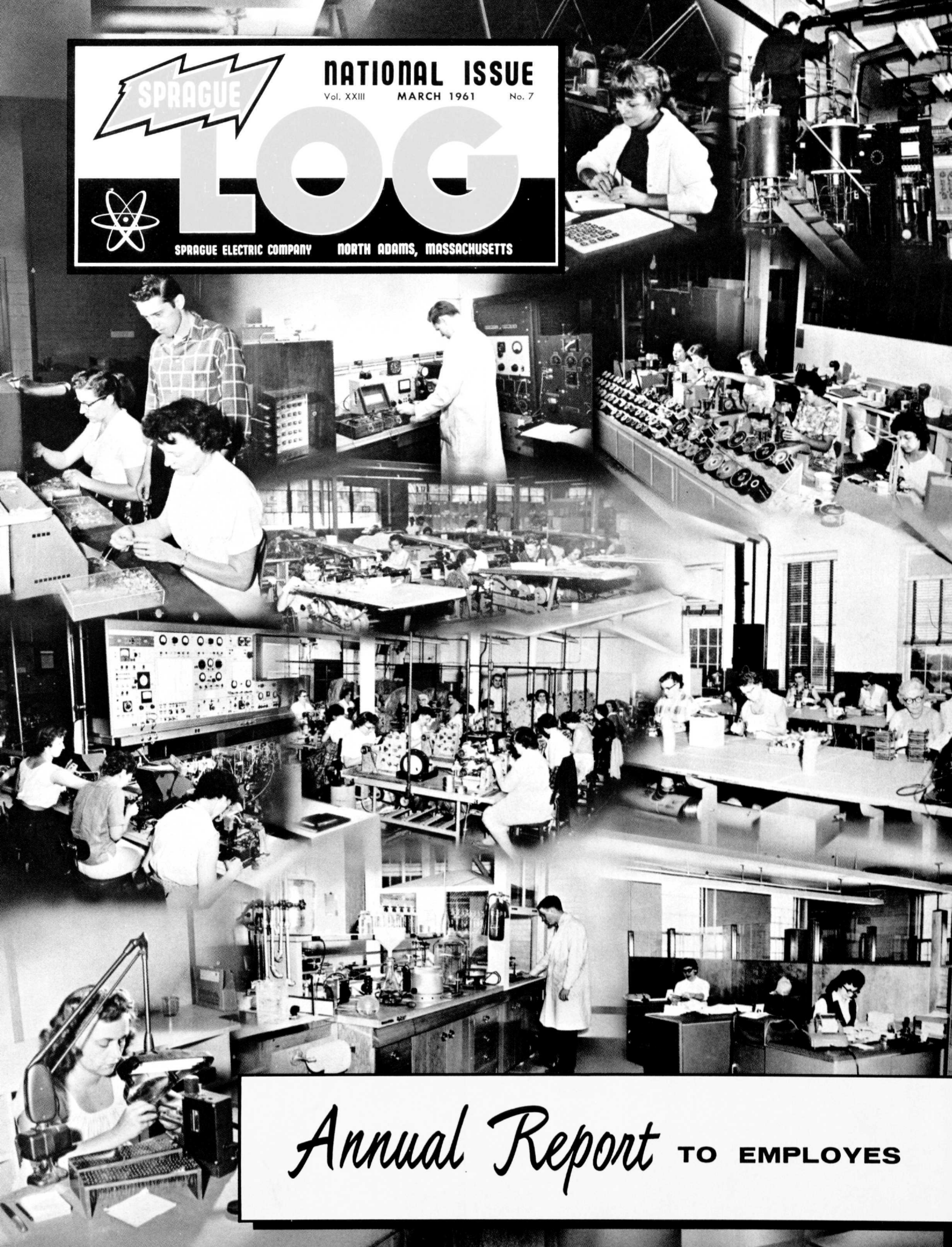
Vol. XXIII MARCH 1961 No. 7



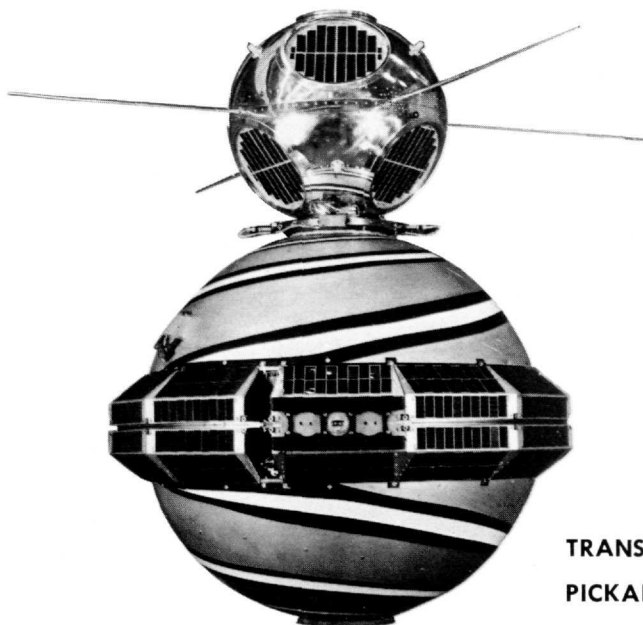
SPRAGUE ELECTRIC COMPANY

NORTH ADAMS, MASSACHUSETTS

LOG



Annual Report TO EMPLOYEES



SPRAGUE COMPONENTS *Orbit in Space*

**TRANSIT IIA WITH
PICKABACK GREB SATELLITE**

Sprague Electric components are orbiting in space in three different satellites as part of the Navy's Bureau of Naval Weapons Transit Satellite program. Sprague components built into the Transit Satellite include ceramics, solid electrolytic tantalums, sub-miniature vitamin Q metal clad papers and many others. Probably our most important contribution was the 200 MF 25V units made by the Special Products Division especially for the Transit program.

Most recent accomplishment in this program was the launching of the TRANSIT IIIB, a much advanced edition of the TRANSIT IIA which was successfully launched in June, 1960.

Project TRANSIT is designed to develop and demonstrate equipment which will provide a reliable means of fixing the position of surface craft, submarines, and aircraft anywhere in the world. It will be available in all weather conditions and more precisely than heretofore possible. It will also provide more accurate means of maritime and aerial navigation than is now available.

Transit satellites weigh between 50 and 100 pounds and are designed to have an operational life of 5 years. They contain a miniaturized digital memory for storing orbital information received from the ground station and a modulator for pulse-modulating this information on the transmitted frequencies for retransmittal to the navigating stations. The satellites are completely transistorized and use solar power.

Also part of the program is the Pickaback Project in which a second satellite rides along with the main satellite into orbit. At a signal it is separated by spring force from the TRANSIT Satellite and goes into its own orbit. Both pickaback satellites launched to date were armed with special devices to study and provide new information on the ionosphere, the electrically charged layer of atmosphere that bounces radio waves back to earth.

Johns Hopkins Physics Laboratory, an affiliate of Johns Hopkins University, is the developer of the TRANSIT Satellite and the prime contractor.



SPRAGUE'S FOREIGN BUSINESS

13 YEARS OF DEVELOPMENT



WILLIAM M. ADAMS
President,
Sprague International, Ltd.

Sale of Sprague Electric components in foreign countries has developed dramatically during the past decade. We have built, and are continuing to build, a network of sales and manufacturing companies which reach electronic markets around the world.

The growth of these foreign operations is as interesting and vital as the growth of the Sprague Electric Company itself. Prior to 1947 Sprague exports were handled by independent exporters in New York and Boston. As we entered the post-war period, however, one fact became increasingly apparent - if we were to participate to the fullest extent in the anticipated great growth of the electronic industry overseas, we must get closer to our foreign customers and handle exports directly, rather than through intermediaries.

In the Spring of 1947, Mr. William M. Adams was appointed director of our Foreign activities and the Export Division (later renamed Overseas Operations) was organized. Mr. Adams possessed a background of many years experience in European and American business, a fluency in several foreign languages, and had travelled widely throughout the world. The original staff of Mr. Adams and his secretary has developed to the point where we now have a staff of 18 in North Adams working exclusively on export and foreign matters and also have selling agencies or

offices in all countries of the free world. In addition to the home offices, we will soon have six wholly-owned factories outside the continental United States and an important stake in an English company, Telegraph Condenser Co. Ltd. (T.C.C.) which itself has other manufacturing facilities outside the United Kingdom.

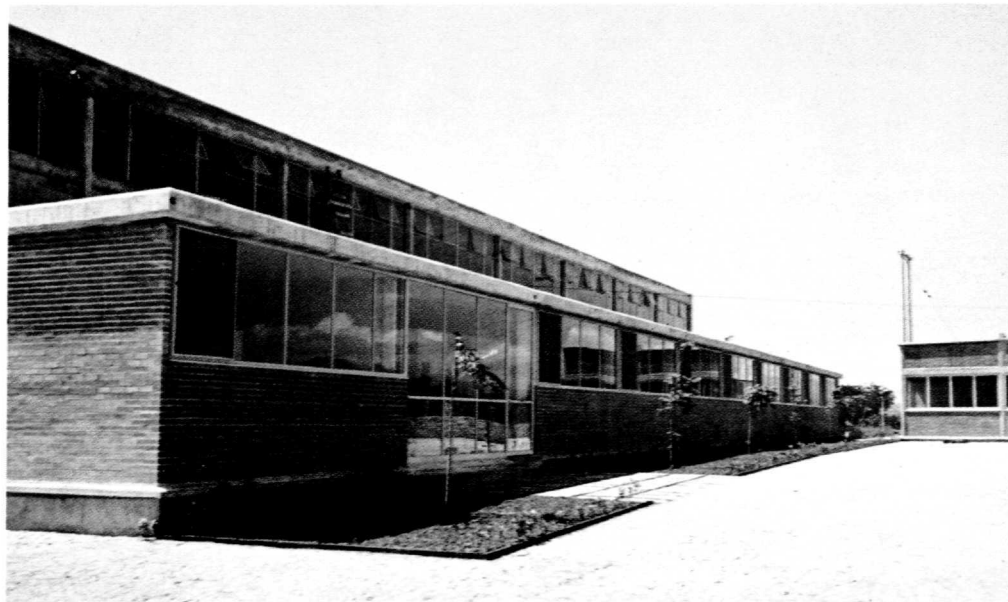
Sprague has become a leader in its field abroad.

Let's go back and trace his growth and see what an interesting story it really is. In 1947 there was substantial demand throughout the world for American electronic equipment and components. After the first burst of buying that followed the end of World War II, however, practi-

cally all our potential customer countries began to run short of dollars and were forced either to restrict or entirely prohibit import of our products. England, for example, was completely closed to the import of U. S. - made capacitors.

While our customer countries were making it difficult, and in some cases impossible, for us to export our products to them, some began to subsidize or otherwise encourage the development of locally-based manufacturing operations to take care of their fast increasing electronics markets. The Marshall Plan and the United States Government's technical assistance program helped European countries increase the quality and capacity of their own electronics manu-

Sprague Mexicana S. A., Alpuyecá, Mexico



facturing industries, while tariff barriers further discouraged imports from other nations. Despite these handicaps we continued to seek new markets and improve our selling techniques. Our total exports increased steadily.

In 1951, Mr. George F. Ferran joined our team as Assistant to Mr. Adams. With an extensive background in export matters and in Latin America in particular, Mr. Ferran has the responsibility of overseeing the Export sales office with all its many ramifications.

In late 1952 another step forward was taken with the organization of Sprague International, Ltd. As a Western Hemisphere Corporation it serves Canada, Central and South America, Cuba, Puerto Rico, and various islands in the Caribbean. At about the same time, a jobber sales organization was established in Canada which fulfills a mission there quite similar to that of Sprague Products Company in the United States.

Meanwhile potential foreign markets for Sprague products grew rapidly as the industrialization of overseas nations increased. We were unable to take full advantage of this increased demand, however, due to the import restriction on American goods, the continuing dollar



George Ferran



William Cunningham



Giacomo Giacomello

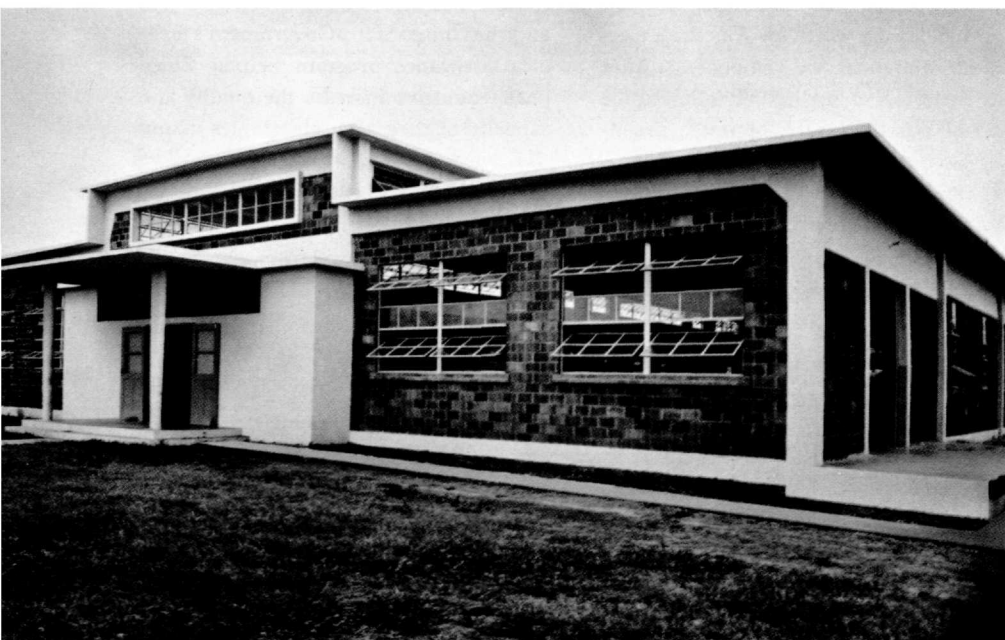
shortage in other nations, and the desire of many foreign governments to protect their own budding electronic industries. Because of these several factors, the next step in our development could not be long delayed - we were faced with the necessity of giving serious thought to establishing our own manufacturing facilities abroad.

Our first venture outside of the continental limits of the United States was the establishment of a wholly-owned company in Ponce, Puerto Rico for the manufacture of molded tubular capacitors. Known as the Sprague Caribe Company, this plant started operations

in 1954. At the time of Sprague Caribe's establishment the market for molded tubulars exceeded the production capabilities of our domestic plants. Sprague Caribe was designed to help relieve this shortage. Our operations in Puerto Rico, under the leadership of Mr. William J. Cunningham, progressed satisfactorily, and in 1960 a second company, Sprague Ponce Company, was organized in Ponce to manufacture solid tantalum capacitors. Operations are now being carried on in a leased plant while a permanent factory is being constructed. It is expected that Sprague Ponce will prove a valuable member of Sprague Electric's manufacturing complex. In all our activities in Puerto Rico we have been given valuable assistance by the Puerto Rican government authorities. Through the industrialization program they conduct under the name "Operation Boot Strap", they have helped to lift the economy of the island up by its boot straps and have moved toward the goal of converting Puerto Rico from a relatively poor and backward community into a modern and thriving economy.

While we were forging ahead with our operations in Puerto Rico, Europe was also rapidly getting back on its feet from the ravages of World War II, and the countries of Free Europe were giving more and more acceptance to establishing a united commercial economy. They had successfully combined in coal and steel operations and this seemed to indicate clearly that even greater benefits could accrue from a commercial "United States of Europe".

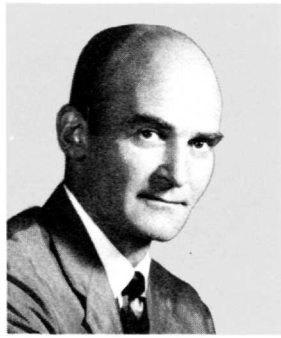
Negotiations between the various



Sprague Caribe, Ponce, Puerto Rico



Percy Spring



Norton Cushman



Peter Kraehenbuehl

European countries were started in earnest to form a united customs bloc so that countries could trade with each other without the barriers of heavy customs duties. As is often the case in such matters, complete agreement with all the countries concerned was impossible. A split occurred, with France and England as the principal opponents. Other countries lined up in the two 'camps' which resulted from the split.

The French-led group, consisting of Belgium, France, Germany, Holland, Italy, and Luxembourg, decided to move ahead and formed the European Economic Community (which became known as EEC and is often referred to as the "European Common Market"). This group provided for a step-by-step reduction in tariffs and import restriction between their respective countries, while maintaining their tariffs on imports from all other countries. Among these others, of course, was the United States.

While EEC negotiations were still in progress, Sprague Electric officials were studying how we could best meet this situation. The only sound answer was to establish production facilities within the EEC area. The potential need for electronic components in these six nations would surely be substantial. Location was certain to be of prime importance, and after a careful survey of each country was made it was decided to locate in Italy.

In 1956, with the area thus pinpointed, Sprague purchased a controlling interest in a small but technically proficient capacitor manufacturing company in

Milan, Italy, known by the initials C.R.E.A.S. (Construzioni Elettriche Applicazioni Speciali) S.p.A.

Mr. Giacomo Giacomello, founder of CREAS, was retained as Managing Director, and our first European venture was started. Our decision proved to be a sound one and sales increased rapidly – so rapidly in fact that it soon became necessary to double the production facilities. CREAS concentrates on the production of electrolytic capacitors and confidently hopes to become the major supplier in the EEC area of operation.

In early 1960, Sprague purchased the minority holding of CREAS and became

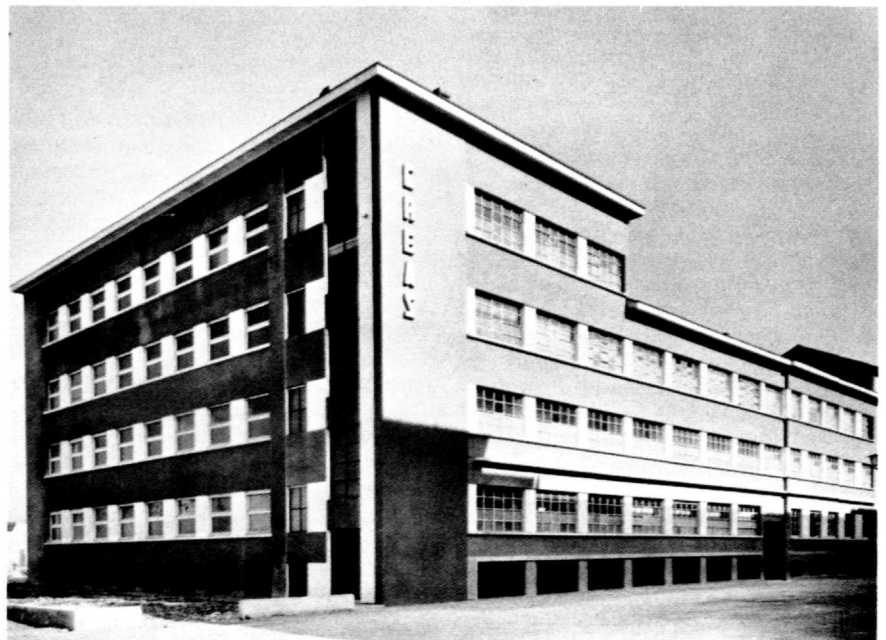
the sole owner. The company was renamed Sprague-CREAS. Demands have continued to increase for the company's products and further increased production and plant expansion is now underway.

Before we had a plant in Italy we had difficulty in selling Sprague U. S.-made goods there, but since then our sales of U. S.-made components have increased encouragingly. We have found almost invariably that when we set up manufacturing facilities in a foreign country, the sale of other items (made in the U. S. A.) begins to increase. The reason for this is logical: our locally based factories are in close touch not only with customers in their territory but also with the local government officials. These officials will always favor a local concern when granting import permits.

Therefore, contrary to the belief that some may hold, it is a fact that Sprague's foreign-based factories not only return a profit to Sprague Electric, which we otherwise would not have, but also stimulate the sale in their countries of goods made in Sprague's U. S. factories.

After having established ourselves favorably in the European Economic Community we were still faced with the

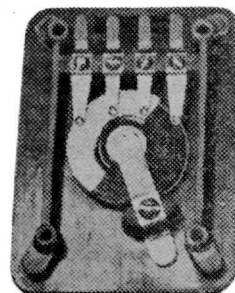
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Sprague-Creas, Milan, Italy



SPRAGUE SPECIALTIES' FIRST PATENT
(Renamed Sprague Electric in 1943)



THE TONE CONTROL -
OUR FIRST PRODUCT

WHY ARE PATENTS IMPORTANT? THEY HELP PROVIDE JOB SECURITY



VINCENT H. SWEENEY
Manager, Patent Services,
Research & Engineering
Laboratories

In the approximately thirty-four years between Robert C. Sprague's April 1927 patents on tone-control condensers and the expected March 1961 patent to William Allison on a process for making paper capacitors, there have been over four hundred U. S. Letters Patents assigned to Sprague Electric Company. This imposing number of patents which stretches from the beginnings of the Company into its future makes Sprague Electric the largest holder of U. S. patents among companies active in our area of the electrical components industry. The history and growth of the Company can be followed to a considerable degree by reading the patents issued to the prolific inventors of the Company, men like Dr. Preston Robinson, Dr. Sidney Ross,

Stanley Dorst and David Peck. Recent patents of importance to Sprague Electric have been issued to Walter Lamphier on our metallized capacitors, and to Earl Burke on a revolutionary foil transport system for automatic capacitor rolling machines.

It is fitting that patents should extend throughout the life of our Company, in that patents have extended throughout the life of our Country. The basis for the American Patent System is found in Article I, Section 8 of our Constitution, wherein Congress was given the power to promote the progress of science and the useful arts by securing for limited times to authors and inventors the exclusive rights to their respective writings and discoveries. From the first Federal patent to Samuel Hopkins in 1790 to next month's patents to Sprague Electric is a history of nearly three million patents that form a working history of the progress of industry in the United States.

Despite the close association between patents and our Company, and between patents and our Country, patents remain a thing of mystery to many. One of the

ways to remove part of this mystery is to answer several of the questions that are most frequently asked regarding patents.

What is a patent?

A patent is a grant by the Government to an inventor of the right to exclude others for seventeen years from making, using, or selling his invention in this country.

Doesn't this mean that the Government gives an unfair advantage to the inventor over the rest of the public? Isn't this, something for nothing?

No, a patent may be considered to be a contract between the Government and the inventor. The Government gives the seventeen year exclusionary right to the inventor only in return for the inventor's complete disclosure to the public of his invention in sufficient detail to permit the public to practice the invention once the seventeen year-period has expired.

Why not just pay the inventor some money and let the public start to use the invention immediately?

Our founding fathers carefully drafted the Constitution to limit the power that Congress should have in regard to the reward to be given an inventor for his disclosure to the public. The Constitution clearly provides that the reward shall be in the form of an exclusive right for a limited time to the fruits of the invention. The American Patent System is another example of the foresight of the drafters of the Constitution. The exclusive right for a limited number of years forces the inventor to do something with his patent if he hopes to obtain any monetary gain. The inventor cannot just sit back and wait for the Government to do something for him; instead he must go into the market place with his invention. A single lump sum payment to an inventor instead of the exclusionary right for seventeen years would also raise many difficult problems with respect to the amount of the award. Some patents are obviously worth more than others, and yet often the more promising prove worthless, while the seemingly unimportant rise to considerable stature during the course of the seventeen years.

Do you mean that once the Government grants a patent it offers no further aid to the inventor?

The patent is a valuable piece of personal property and may be treated as any other personal property; it may be bartered and sold, and may be litigated in Federal courts to permit the patent holder to protect his rights against the infringement of others.

Your definition of a patent implies that a patent gives protection only in this country. Doesn't this give someone in another country the opportunity to copy the patented invention and exploit it for his own purposes?

Yes, that is the situation if the inventor does not obtain full patent protection for his invention in any country in which he believes he might be able to effectively use the invention. The inventor is aided in gaining foreign protection for his invention by the Convention for the Protection of Industrial Property which has as members most of the industrialized countries of the world.

This Convention permits an inventor to file a substantial duplicate of his U. S. patent application in any of the member countries and be given the same rights afforded a national of that country.

The right to exclude others for seventeen years sounds like the makings of a monopoly. I thought we were opposed to monopolies.

A patent permits a limited monopoly to be established; however, this is a lawful monopoly and one to which the Government is a ready partner. Moreover, this is a monopoly that has many restrictions beyond the limitation of seventeen years and again the Government is a ready and able partner in the enforcement of these restrictions. The Justice Department is constantly on the alert against the misuse of patents whereby patent holders seek to enlarge the coverage or extend the monopoly, as for example by attempting to control the sale of unpatented articles by tying them into the sale of patented items.

What happens if there is misuse of a patent?

Any offended party, or usually the Justice Department, can take court action to put a stop to the unlawful practice. The actions by the Justice Department frequently result in so-called consent decrees whereby the patent holder consents to make his patents immediately available for license to others at little or no royalty.

Why is there a patent system in this country?

Apart from the legal basis provided in the Constitution and the various laws that have been enacted by Congress since 1790, there are sound business considerations in support of our patent system. Much of the support for the research that produces the progress and protection for the American way of life would not be expended if it were not for the protection promised by the patent system. Consider, for example, the deterrent to the expenditures of research funds in a highly competitive industry if the fruits of the expenditure would be available to all, and thereby place the one expending the funds in the poorest competitive financial position. Without the American Patent System there would be fewer new products on the market because of fear that competitors would copy the product and (because of no development expenditures) be able to sell the product at a lower price than the originator.

Then I take it that you are saying that patents do promote progress in accordance with the Constitutional mandate?

Yes, another way of looking at the reason for and the importance of patents is to consider what happens to a manufacturer when his competitor produces a fast selling new product that is patented. The manufacturer must either take a license under the patent or develop a new invention and new product of his own to be able to continue to compete with his competitor. This is a stimulus to industrial progress that in itself would appear to justify our patent system.

This raises the question of expense. Isn't it true that patents are expensive to obtain?

Worthless patents are extremely expensive to obtain, in that the significant expenditure of money and time is completely lost. However, a worthwhile patent is an extremely good investment on the part of the inventor, because the same expenditure can result in many-fold profits from an exclusive market and/or royalties from competitors who take license under the patent.

What are the Government fees involved in obtaining a patent, and do these fees support the American Patent System?

For the average patent, the Government fees amount to less than one hundred dollars. Since the application that matures into this average patent is prosecuted in the Patent Office for roughly three to four years, the fees do not support the entire operation. Congress in several instances had decided that the Patent Office provides a service to the American public that justifies partial support through public funds.

Why does it take so long to get a patent?

Some of the delay is the result of budget limitations at the Patent Office. There are only about eleven hundred Patent Examiners to handle nearly ninety thousand new applications each year, and to issue the approximately fifty thousand patents that are issued each year. On the positive side, however, are the delays caused by the safeguards that are written into our present

Continued on Page 8

Patent Office rules and procedures. Applicants are permitted to respond to Patent Office actions on their applications, and to amend their application to avoid objections that may be raised by the Patent Office. Thus, a part of the period of pendency of an application is taken up by the applicant himself in preparing and formulating these responses to the Patent Office. Then there are the safeguards such as the search procedures and interference procedures in the Patent Office which guarantee to the inventor that a patent issued by the U. S. Patent Office has a substantial chance of being held valid in the Courts.

Just what is an interference proceeding?

When two or more applications attempt to claim the same invention, the Patent Office sets up a procedure whereby the inventors disclose their earliest dates of conception and reduction to practice of the invention, and thereby enable the Patent Office to determine the first inventor, and grant the patent to that first inventor.

You stated that patents have a substantial chance of being held valid in Court. Yet, we often read of patents being held invalid.

The publicity that is given to the cases where a patent is held invalid by the Courts oftentimes creates the impression that no patent is valid unless successfully litigated. On the contrary, there is a statutory legal presumption that a patent is valid until proven otherwise. The vast majority of patents never get to Court, either because of a recognition by industry that the patents are valid or alternatively a recognition by patentees that the patents are weak. It would appear that patents that go to trial in Court must be the subject of a genuine controversy between the parties. In this situation, we could expect to find fifty percent of the patents held valid, and fifty percent held invalid. Actually, the decision for the past three, or four years are quite close to this fifty-fifty prediction.

What is patentable?

Any useful new and unobvious article, process, apparatus, or composition is the proper subject matter of a patent. There are certain limitations that prevent issuance of patents on defense secrets and immoral matter.

What is meant by new and unobvious?

The term "new and unobvious" has grown to mean anything not previously known or fairly suggested to one skilled in the art. The somewhat mythical "one skilled in the art" is intended to be the ordinary practitioner of the particular industrial art. If there is no knowledge in the public domain that would fairly suggest the invention to this "one skilled in the art", then the invention is properly patentable. The Patent Office is the agency that makes the determination in the first instance of whether the invention satisfies these requirements. In a like manner, the Courts make the final determination if an invention reaches the level of being truly "new and unobvious".

Who may obtain a patent?

In the United States only the inventor, or if the inventor is deceased the administrator or executor of the inventor's estate, may apply for a patent. In many foreign countries the right to apply for a patent is in the hands of the assignee or employer of the inventor. An application for a patent in the United States must be accompanied by an oath of the inventor to the effect that to the best of his knowledge and belief the invention has not been in public use or on sale in the U. S. for more than one year, and has not been patented or described in any printed publication in any country more than one year prior to the application. The inventor must also state under oath that he believes himself to be the original and first inventor. A foreign applicant is afforded the same rights and protection as a citizen of the United States.

You stated that only the inventor can apply for a patent, yet most of the patents with which we are familiar are the property of organizations rather than individuals, as for examples, the four hundred patents that are assigned to Sprague Electric Company.

Actually, U. S. patents are always issued in the name of the inventor, with any assignment that may have been made to another showing on the face of the patent. Assignments usually result either from so-called shoprights or from actual contracts between inventors and their employers. The shopright that gives title of an invention to the employer

arises from the common law consideration that one who puts an inventor in a position to invent and supports him during the invention is entitled to the benefits of the invention. At Sprague Electric, the professional staff is under written contract to assign all inventions and patents to the Company.

Is it true that the laboratories of industry now produce far more patents than the old-time inventor working alone?

Although this is presently true, the do-it-yourself fad that has been gaining popularity over the past few years appears to have slowed this trend.

Many patents appear to be directed to similar inventions. Is it possible to obtain more than one patent on an invention?

Only one patent may be granted for an invention. However, patents may be granted to cover improvement over an already patented invention. All that is required is that the improvement must be new and not obvious from the issued basic patent.

Does this mean that the one who gains an improvement patent is free to operate without regard to the basic patent?

It must be remembered that the grant of a patent gives no positive right to an inventor, only the right to exclude others from his patented areas. Thus, it is entirely possible for a patentee to find that he cannot practice his invention without obtaining a license from the holder of a more basic patent. Alternatively, the holder of a basic patent cannot practice the invention in an improvement patent without permission of its owner.

This article has attempted to provide answers to only a few questions relating to the nature of our patent system and to the more general aspects of the operation of that system. No attempt has been made to go into the problems of selecting which invention should be patented. In a like manner the interesting and sometimes complex prosecution of a patent application through the Patent Office and to maturity as a patent has not been discussed. It should also be noted that this article has not discussed the less common forms of U. S. patents such as design patents and plant (horticulture) patents.

1960 ANNUAL REPORT TO SPRAGUE ELECTRIC EMPLOYEES

REVIEW OF THE YEAR SHOWS A CONTINUATION OF THE RAPID GROWTH OF MILITARY, COMMERCIAL AND INDUSTRIAL ELECTRONIC MARKETS

OUR MILITARY AND INDUSTRIAL MARKETS

For both your Company and the electronics industry, 1960 saw a continuation of the rapid growth of the military and industrial electronics markets. In the military area, the years since Korea have witnessed dramatic changes in the effectiveness of our defense systems and the industrial field has seen the everwidening application of the new technologies of electronics to meet the growing complexity of the business world.

CHANGING GOALS

In the last several years, the emphasis in our defense programs has shifted to the design of very complex systems for retaliation against surprise attack. Many of these systems embrace the entire range of modern weapons on land, sea, and in the air, and link them together into a vast network that spans the globe and reaches now into outer space — a network upon whose effectiveness and reliability our security depends. Because of the variety of roles assigned to the various parts of such systems, and the rapidity with which they must carry out their roles, they are all characterized by a burgeoning need for information acquisition and processing, which must take place at very high speeds and over very long distances. Because of their great complexity, they must be built of components for which the probability of failure is virtually zero. Thus, the quest for speed and the quest for reliability in the handling of vast amounts of information are the main goals of military electronic science today.

Although less critical than those of defense procurement, the needs of busi-

ness and industry for better ways to handle information rapidly are also increasing with the expansion of our economy and the broadening interest in the application of advanced techniques of decision making to the problems of managing men and machines.

COMPUTERS - The Quest for Speed

The offspring of the marriage of electronics and information theory is the digital computer. Computers will be found at the heart of every Continental air defense installation, every guided missile system, every supersonic bomber, and most of the ships at sea; it is believed that computers represent the largest single class of products in military electronic procurement. The value of military computer products is estimated to have increased more than 10-fold between 1953 and 1960, or from \$55 million to \$700 million; it is expected to double again by 1965.

Reflecting their increasing application in industrial and scientific data-handling, commercial computer products have also gained rapidly, from \$25 million in 1953 to approximately \$450 million in 1960 for these applications. Further advances in the technology of business data processing will probably come even more rapidly in the future, as techniques engendered by needs of the military continue to be applied to business problems, and the commercial computer market is therefore expected to nearly triple by 1965. As shown on the chart on page 12, the total market for computers, both military and commercial, has grown much more rapidly than the total value of end equipment produced by our industry in the past decade,



ROBERT C. SPRAGUE
Chairman of the Board
and Chief Executive Officer

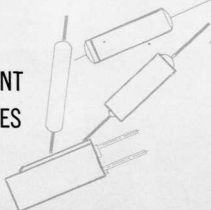
and the signs suggest that this faster rate of growth will continue.

In view of the growing importance of computers, we have devoted substantial research and engineering effort to the development of computer components, and today computers represent the fastest growing segment of both our military and commercial markets. Our largest participation in this field is as a producer of tantalum capacitors, which are the most widely used type of capacitor in the newer generation of computers, whether intended for airborne use in a flight control system, for business data processing, or in the guidance system of an InterContinental Ballistic Missile. Demand for tantalum capacitors, which are ideally suited to the transistorized circuitry of modern computers, again increased substantially during the year 1960, and is expected to show unusual future expansion reflecting the anticipated doubling at least of the total computer market over the next five years. Growing demand for our Type 150D Solid Electrolyte TANTALEX® Capacitors necessitated further expansion of the manufacturing capacity of our plant in Concord, New Hampshire. Plans have recently been made also for the construction of a new plant for solid tantalum capacitors at Plymouth, New Hampshire, which is expected to be completed by June, 1961. Our resistor business, particularly in close-tolerance deposited carbon and metal film types, should also benefit from the growth of the computer market.

Our Special Products Division in 1960 maintained its satisfactory rate of increase in sales and profits as a supplier of custom-engineered computer

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REPLACEMENT
PARTS SALES



OTHER INCOME

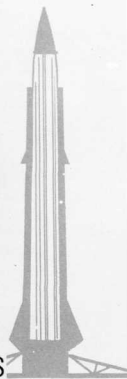


\$66,029,241.00

HOME
ENTERTAINMENT
SALES



MILITARY
ELECTRONIC SALES



INCOME

Annual Report of

OUTGO

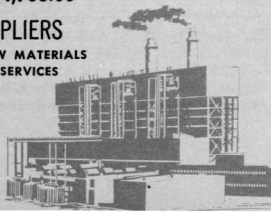
\$27,540,383.00

EMPLOYEES
WAGES AND SALARIES



\$25,574,706.00

SUPPLIERS
FOR RAW MATERIALS
AND SERVICES



\$6,000,774.00

DIRECT TAXES
FEDERAL, STATE
AND LOCAL

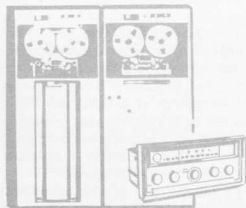


\$3,216,451.00

REPLACEMENT
AND EXPANSIO
PLANT, EQUIPMENT
AND OTHER ITEMS



INDUSTRIAL AND
COMMERCIAL
ELECTRONIC SALES



The Annual Report of Sprague Electric Activities are summarized on these pages. This Income and Outgo Statement is a summary of the year's business. A comparison with our 1959 Annual Report will show that Total Income increased by \$9,295,717.00.

SPRAGUE ELECTRIC *activities in 1960*

\$1,940,258.00

DEPRECIATION AND
AMORTIZATION



\$1,665,591.00

DIVIDENDS
TO STOCKHOLDERS



\$91,078.00

INTEREST
ON BORROWED MONEY



Continued from Page 9
logic components and subassemblies. Added to its products were a standard line of precision toroidal inductors manufactured to very close tolerances, new types of pulse transformers, core-diode and core-transistor shift registers, and the LOGILINE® series of 5 mc./second transistor switching circuits; available in either etched wiring board assemblies or as encapsulated modules, these circuits are equally suited for laboratory, prototype or production applications in digital systems.

SPRAGUE TRANSISTORS

Your Company has participated in the computer market as a producer of Surface Barrier, Micro Alloy and Micro Alloy Diffused-base Transistors under license from Philco Corporation. 1960 was a year of continued progress and further strengthening of our capability in the manufacture of both germanium and silicon high-speed switching transistors, making use of new equipment installed during the year at Concord. However, sales and earnings were adversely affected by wide fluctuations in the rate of production, stemming from a cutback in the funding of the SAGE II system by the Department of Defense in the spring of the year. Your Company had expended substantial sums in installing additional equipment and training personnel to enable it to produce very large quantities of Micro-Alloy Diffused-base Transistor for the SAGE computers, and had just begun large volume production with satisfactory results when the program was curtailed, resulting in the cancellation of the balance of open orders for this system. The ensuing reduction in the level of transistor operations necessitated very expensive

readjustments in our plans, and resulted in idle capacity for much of the balance of the year.

In order to obtain additional transistor business, which we now are in a position to handle, our transistor marketing efforts have been considerably stepped up, and several additional types of transistors have been added to the line. These include Germanium Micro Alloy transistors especially designed for switching applications at frequencies up to 50 megacycles, several VHF and UHF amplifier and high-speed switching types in smaller case sizes, and several varieties of Silicon Surface Alloy Transistors (Type SAT) designed for highspeed switching, amplifier, and oscillator applications at junction temperatures up to 140° C.

Because of the growing importance of our transistor business and the specialized nature of its engineering, production and marketing problems, all activities in these areas were combined under unified management and control by the establishment in October of our Transistor Division with headquarters in the Concord plant. The Transistor Division thus became our second operating division, joining the Special Products Division, which was established in 1958 and which has demonstrated the effectiveness of this form of organization for products with very special technical characteristics.

The outlook for your Company's business in the computer field in 1961 is bright in all products serving this market, reflecting anticipated increases in sales of computer equipment from \$1.2 billion in 1960 to at least \$1.5 billion this year. We look for strong growth in computer capacitors, particularly tan-

talum, as well as in the activities of the Special Products Division. Unit and dollar volume in transistors should continue the rapid growth of recent years, especially in the computer switching types in which we specialize.

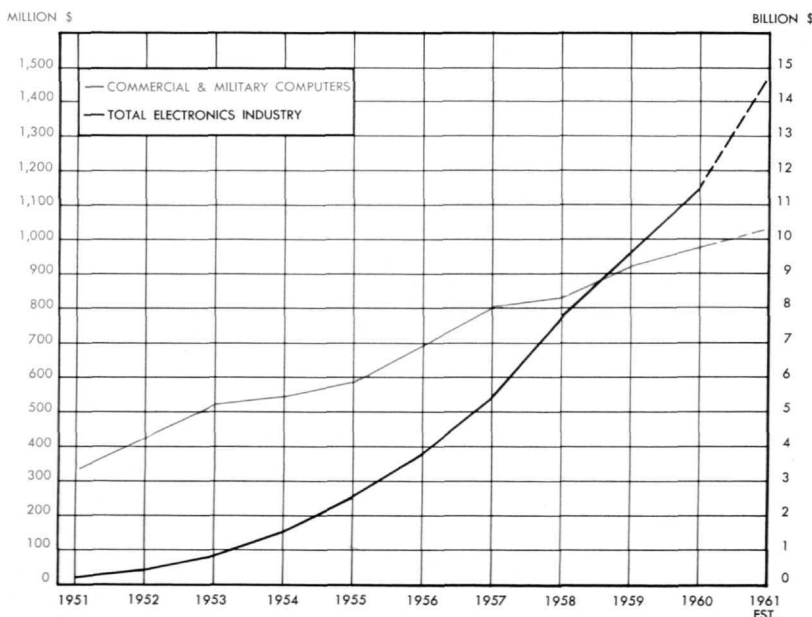
BALLISTIC MISSILES - The Quest for Reliability

The realities of nuclear warfare are such that a retaliatory system, if it is to be an effective deterrent to surprise attack, must be capable of being set in motion in the very brief time that will be available after the presence of attacking weapons has been detected. For this reason, great emphasis is being placed on the development of a solid-fuel ICBM which can be kept in a state of complete readiness at all times, rather than having to go through the lengthy countdown required for liquid-fuel missiles.

The implications of this continuous readiness for system reliability are tremendous, because highly complex electronic gear consisting of millions of components must be capable of being stored without degradation or failure for at least three years, and still be capable of reliable operation after a several-minute launching period during which it is subjected to severe shock, vibration, and temperature environments. The successful firing of the first Minuteman solid-fuel missile from Cape Canaveral in February, 1961 demonstrated that the system works; however, its reliability after months or years of storage in underground "hard sites" remains to be demonstrated. Your Company is proud to have an important part in what is probably the most ambitious and comprehensive reliability program in the electronics industry to date—a program designed to demonstrate this reliability.

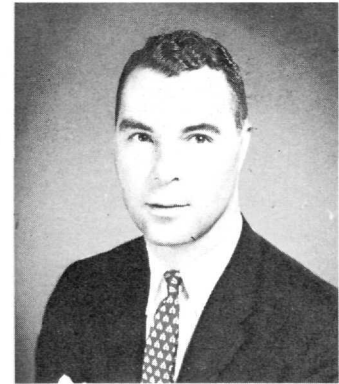
The Minuteman program well illustrates the twin quests for speed and reliability which were mentioned above as the principal goals of military electronics today. An inertially guided missile, the warhead is in a ballistic trajectory after the third stage of power and guidance circuitry has separated from it; this means that in the brief period of a few seconds prior to the separation, the system's guidance computer must calculate and recalculate the trajectory to correct for any deviations occurring at the time of launching. It must take these calculations at lightning speed and with complete accuracy, and the entire system must be able to function after a long period of storage. For the component manufacturer, these stringent requirements of the Minuteman system mean that an improvement in reliability of 100 to 1000 fold over the

Continued on Page 17



ICFS

A Unique Service



FREDERICK S. SCARBOROUGH
Manager of Interference Control
Field Service

The Interference Control Field Service Department of the Sprague Electric Company is a group whose preoccupation is with a particular phenomenon. It used to be called 'static'. The experience is a familiar one. You are listening to your radio. Your neighbor plugs in his electric razor and suddenly it is no longer possible for you to distinguish the music or words to which you had been listening from the overriding buzz set up by that annoying little signal source beyond the next wall. There are related phenomena associated with television. The picture is suddenly lost in a storm of snow or in a jungle of wild zig-zagging lines. In cases like this, a proper term would be Radio Frequency Annoyance because the listening or viewing is done largely for pleasure. But whenever the listening or viewing is vital, the situation is fundamentally different and we speak not of annoyance, but of Radio Frequency Interference.

The military area is the prime example of a field to which electronic functions have become vital. It is not only listening (communications) and viewing (radar). It is counting, computing, guidance, navigation, flight control and a host of other indispensable tasks which have been assigned to the field of electronics. Any one of them, however perfect the operation of the equipment may be when used alone, can be disrupted by those unintended and undesired aspects of the electrical environment which we used to call static.

This began to be a problem during World War II. One still hears the story of the airfield in North Africa which had to be evacuated because of a sudden and unexpected enemy advance. The

interference from the ignition systems of perhaps fifty airplanes, warming up for emergency take-off, blotted out all communications between tower and pilots. What could have been an orderly evacuation became a chaotic and tragic fiasco.

The Sprague Electric Company was active in this new field in those years. There were frequent visits by Sprague engineers to Fort Monmouth where efforts were made to solve these problems as they appeared and were reported back from the field. Suppression components for aircraft, jeeps and trucks were designed and were manufactured by Sprague in large quantities. If memory serves, it was Filter Production which followed gas masks into the then newly acquired Brown Street plant. The product was an important one and the quantities were substantial. The Sprague Electric Company has been a

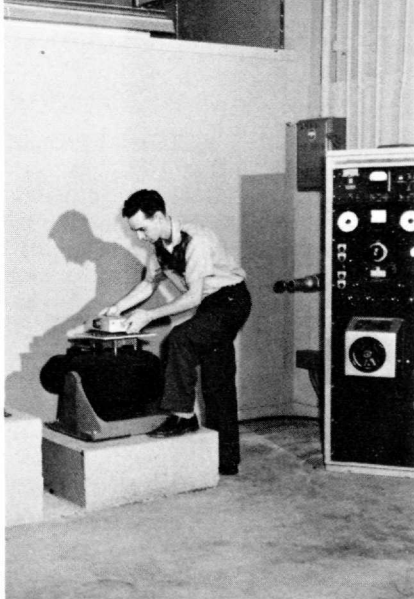
significant factor in the filter business ever since.

Of incidental interest is the fact that some of the senior engineers now in the Interference Control Field Service Department were then young men in uniform assigned the task of tracking down and suppressing those sources of interference about which pilots and navigators and communication officers were complaining.

From the vantage point of today, the problems of those years seem relatively simple. Only communications and, later in the war, radar were involved. The frequencies in use fell in the relatively narrow band between 150 kilocycles and 30 megacycles. There are now specifications which control interference throughout the entire spectrum between 30 cycles per second and 40,000 megacycles.

ICFS personnel brave the elements as they run a series of tests for one of their customers.





Preparations being made to subject a filter to one of the several vibration tests required by the military services.

cles. Receivers are more sensitive and transmitters more powerful than they were then. But probably the principal difference is in the number of electronic equipments carried by the Weapons Systems of today as compared with those of World War II. If the B-17 contained five such equipments, the B-58 contains fifty. With progress, more electronic equipment of increasing importance to the function of the Weapons Systems is being housed in less space.

Reflecting the increasing scope and importance of this problem is the fact that we begin to hear and to speak more of "Electromagnetic Compatibility" than of "Radio Frequency Interference". To speak of the latter is to speak only of the active side of the problem. There is a growing awareness of the passive side, and this concern with "susceptibility" is reflected in most of the contemporary interference specifications. If the electric razor interferes with our enjoyment of the radio program, we can do two things. First we can suppress the electric razor so that the rf interference emanating from it is to some degree lower than it was before. This will improve our radio reception. We can also re-design our radio so that it is less susceptible to the interference set up by the electric razor. In contemporary interference control, the second as well as the first approach is being taken. Electromagnetic Compatibility as a term and as a concept reflects this bilateral approach to an increasingly serious problem.

The manifestations of electromagnetic incompatibility are sometime inter-

esting, sometimes tragic. In a modern, supersonic airborne weapons system it is learned that a particular toggle switch, if actuated when the plane is flying on autopilot, will produce a well executed but entirely unintentional roll to the right. A missile launching is spoiled by the premature firing of the second stage. The best evidence is that an unwanted and unsuspected rf signal was the cause of the failure. A switch transient on the power line to a computer invades an area of the circuitry where the computer, for all its wisdom, cannot distinguish the transient from the digital pulse it is designed to process, and suddenly two plus two equals five. There is a tragic midair collision of two commercial airliners. The possibility that the cause may have been a portable radio or tape recorder carried by one of the passengers is duly reported in the press.

All of this is background information on the general field in which Sprague's Interference Control Field Service Department is active. But what are those activities?

Sprague continues to be a source to the electronics industry of interference control components. These are the rf filters, the Thru-Pass and Hypass capacitors and the ceramic feed-thrus. With the new emphasis on the suppression of audio frequencies, the tantalum capacitor is beginning to play a part in the interference control field. As with the other product lines, there continues to be a sales and field engineering activity in filters. Customers are assisted in the selection of suitable components. Those

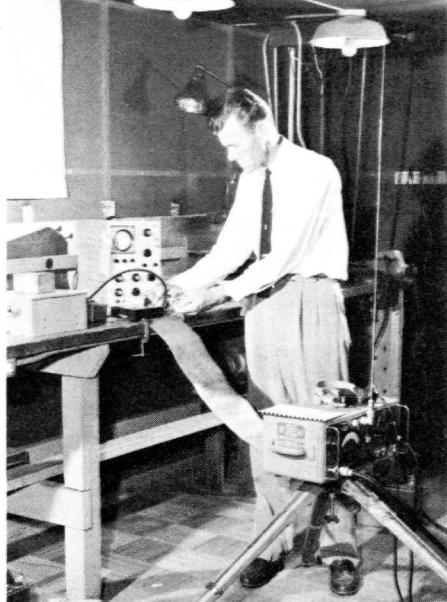
Frank Garlington (left) Manager of the ICFS Laboratory in North Adams, and Frederick Scarborough, Manager of the ICFS Department, look over a typical shielded "R.F." screen room.



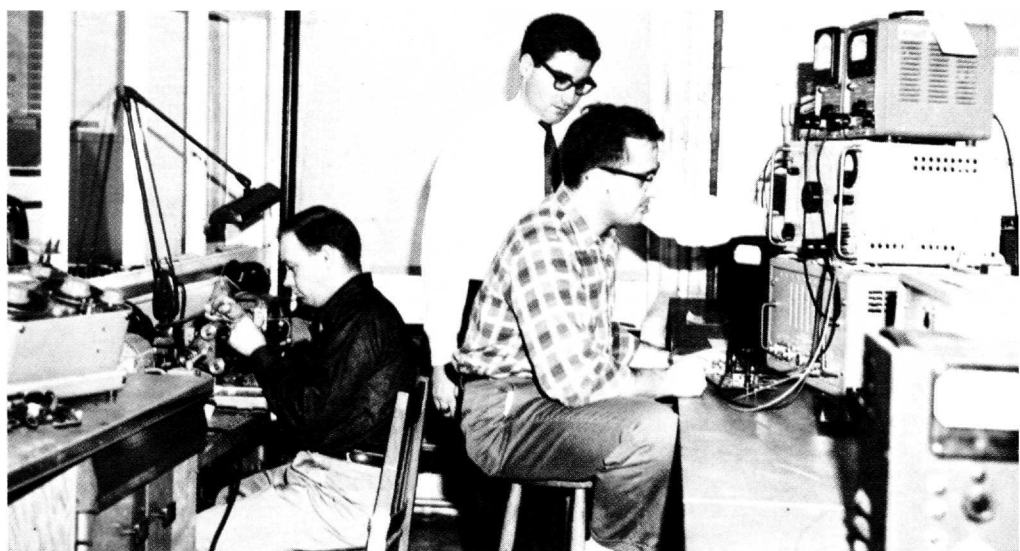
services are rendered through visits and correspondence which are necessary to our sales position in this field. Every effort is made to be in touch with developments in the industry so that those visits and that correspondence will be timely from a sales point of view.

The manufacture of filters to customers' specifications is an important part of the filter activity. The design engineering and production engineering which assures that Sprague's specifications and the customer's specifications are consistent with one another is an important function as it is throughout the Company. Research and engineering in suppression components is equally important. Customer orders must be expeditiously processed and there must be a ready flow of reliable information as to price data and delivery schedules. But in all of this there is nothing unique. There are the same functions in the other product lines involving the joint efforts of Sales and Field Engineering. To approach that which is unique about the Interference Control Field Service Department, let's examine its organization, pointing out those of the general functions which fall under its jurisdiction and giving particular attention to one function which is not duplicated elsewhere in the Company.

The Interference Control Field Service Department under the overall direction of Frederick S. Scarborough assisted by Robert E. Swift, is a section within the Company's Field Engineering Department, headed by Carroll G. Killen, Vice President of Industrial and Military Sales. Its activities are center-



A Sprague engineer adjusts test equipment before beginning the measurement of radio interference levels in a typical Screen Room.



ICFS personnel test wave filters which are used in telemetry systems and other electronic equipment.

ed in three laboratories, one in North Adams under Frank E. Garlington, another in Los Angeles under James L. LeGette, and a third in Dayton, Ohio under Jack McGail. Field engineering activities are, of course, under its jurisdiction. For the past eighteen months, it has also been responsible for research and engineering activities in rf filters and in other specialized suppression components. This R & E function embraces both advanced development work and product design activities. It has jurisdiction over the recently initiated design, development and sales effort in the field of precision wave filters as distinct from rf suppression filters. It maintains the screen room and model shop facilities which are vital to all three laboratories and the environmental test facilities which are situated in the Los Angeles Laboratory.

These interference measurement and prototype facilities are in constant use by customers who bring us their equipment for *evaluation* (does it meet the interference specification or not?); for *modification*, (if it does not meet the specification, we want you to suppress this device so that it will be within specification) and *qualification*, (we want you to run a final test and to submit a formal report certifying that our device is in compliance). The device in question may be as simple as a portable hand drill or it may be as complex as a complete flight control system. All of this is contractually arranged with the customer who pays for the services rendered him. In many cases, the prototype component developed to achieve

compliance becomes a production item procured from us by the customer in whatever quantities may be desired.

Also under the jurisdiction of the Interference Control Field Service Department are the production engineering functions which concern themselves with the correlation of customer specifications and the equivalent Sprague specifications.

Certain segments of the order processing function are the responsibility of the North Adams Interference Control Field Service group. Preliminary cost analysis is another supporting activity coming under Interference Control responsibility. Of these activities, it is only the chargeable services in interference measurement and environmental testing which may come as a mild surprise to the reader accustomed to thinking of the Sprague Electric Company as a source of materials rather than services. Previously, it was only the research and development contracts obtained from the military services which could be considered comparable, in a general way, to the chargeable services rendered by the Interference Control Field Service Department. But the principal service function, the unique activity of this department has not yet been mentioned.

Probably few readers of this article are aware of the fact that at this writing Sprague Interference Control Engineers are assigned full time to RCA in Camden, New Jersey to assist in the interference free design of the Data Link and Telemetry Systems which RCA is contributing to the Dyna-Soar Pro-

gram. This engineering assistance will be rendered in accordance with a schedule extending over the next two years. At this writing also, there are three Sprague Interference Control Engineers assigned to the Boeing Airplane Company in Seattle to assist in the solution of electromagnetic compatibility problems associated with the Minuteman Program. Similarly, a Sprague engineer is assisting the Electric Boat Division of General Dynamics in the development of interference free control mechanisms for the radio telescope to be set up at Sugar Grove, West Virginia. A Sprague engineer and a Sprague technician are presently assigned to Radiation, Incorporated in Melbourne, Florida assisting in the design and development of an important missile component.

These are some of the present activities of what is now called the Systems Engineering Section of the Interference Control Field Service Department, a section headed by Frank E. Garlington, assisted by Charles J. Lamont. It was this group which some years ago assisted the General Electric Company in the interference free design of the airborne portion of the Atlas Guidance System. This group also assisted Stromberg-Carlson, as Interference Control specialists, in the design of the massive GLR-1 passive reconnaissance system. It was this group which contributed 54 engineering man-months in engineering assistance to Convair in Fort Worth, planning and conducting full compatibility tests of the RB-58, ferreting out and correcting the areas of electromag-

netic incompatibility which were encountered during the exhaustive testing of this weapon system.

The listing of the Systems Engineering Section's activities, past and present, could be very considerably expanded. Suffice it to say that the crying need of industry for this type of engineering assistance has lead to a very rapid expansion of the Interference Control Field Service Department. But crying needs do not lead to the expansion of a department unless there exists the technical knowledge which meets that need, together with the imagination to appreciate the potential which it represents, and the ability to establish an organization capable of providing the assistance required.

It is fair to say that the military electronics industry has not kept pace with the rapid increase in importance and complexity of the interference control problem. It is for this reason that the need for specialized assistance is as acute as it is. Among engineers, there is no observable correlation between design competence and interference control engineering capability. Few companies maintain a competent staff specifically assigned to do this important job. Some of these which do maintain such a staff, fail to give it any specific authority over design practices. In many cases, the function is one of those assumed to be taken care of by the environmental test engineer.

Against this background, the Systems Engineering Section is able to put competent Interference Control Specialists at the disposal of the engineering

design group which knows that its equipment must comply with the interference specification, but does not know how to assure, in advance, that it will. And these specialists make a unique contribution.

Interference prediction techniques, worked out and improved by Sprague over a period of several years, are available and can be successfully applied. What was once a cut and try, retrofit operation, is now subject to relatively precise calculation and prediction. It is one thing to test and fix an existing piece of hardware. It is another to study its electrical schematic and mechanical layout and to design into these pre-prototype plans the suppression and shielding which will assure that the hardware, later to be produced, will be in compliance with the interference specification it is intended to meet.

This prediction approach is the unique contribution of the Department's Systems Engineering Group. It is, in the long run, the optimum approach since the cost, time and difficulties involved in modifying equipments, in the design of which no thought was given to interference, can often be staggering, and will always be in excess of the cost, time and difficulty involved in undertaking design with interference control in mind. The dissemination of this truth might be called the peculiar crusade of Sprague's Interference Control Field Service Department and there is increasing evidence that the idea is catching on.

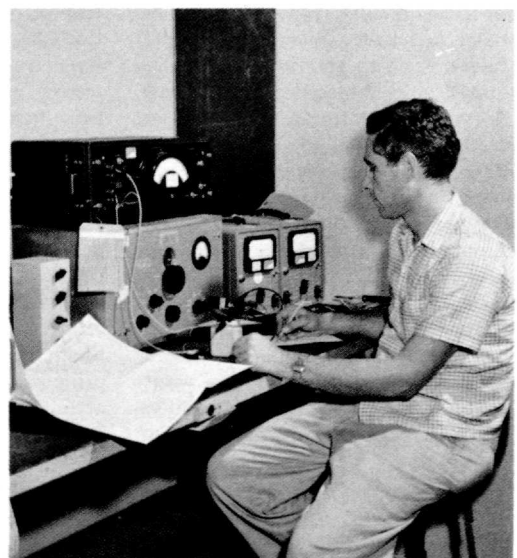
In all of its functions, the Interference Control Field Service Department remains very much a part of the

Sprague Electric Company as a whole. The group is notably dependent on the Filter Production Department as well as the Thru-Pass and Hypass production facilities at Beaver Street. Many sections of the Company's Research and Engineering Department are vital to the filter design effort. So, also are the Quality Control and Reliability Engineers, the Sales Administration Office and the several area sales groups. The guidance and encouragement of Sprague's management has been an important factor in the successful growth of this particular segment of the Company's total activity in the electronics field.

At the present time, the intentional and directed sale of technical assistance is a new experience for the Sprague Electric Company. It has been a happy experience for the very good reason that it has been equally advantageous to Sprague and to Sprague's customers. What significance this has for the future is hard to tell. Is continued growth to be expected or will the equipment manufacturer develop and reinforce his own capability in this area? Are there other unique engineering skills, other backgrounds of experience within the Company which are of significance to and marketable to a dynamic electronics industry? Conjecture on these questions is interesting. The answers remain in the future. One can only be sure that they will be found in Company policy shaped by the future needs of the industry which the Sprague Electric Company serves.



High frequency measurements being made to military interference specifications in an ICFS laboratory.



A technician tests a precision wave filter to be sure that it meets customer specifications.

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most stringent existing specifications must be achieved within a period of 18 to 24 months if Minuteman is to be made operational on schedule in mid-1962. In the case of tantalum capacitors, for example, this means achieving a failure rate in per cent per thousand hours of test of .001%, starting from an already highly reliable level of 0.1-0.5%.

To accomplish these goals, 12 component manufacturers have been chosen by Autonetics, a Division of North American Aviation who is the Associate Prime Contractor for the guidance and flight control systems in Minuteman, to develop the engineering designs, manufacturing techniques and quality assurance procedures necessary to achieve extremely high reliability on specific components in volume production. Having pioneered in the development of highly reliable capacitors over a period of many years, your Company was chosen by Autonetics to undertake the larger of two programs on tantalum capacitors. Subcontracts were signed during the year, covering both solid and foil types and totalling \$3.1 million of Government research and development funds. These programs involve the production and exhaustive testing of more than 100,000 capacitors in special facilities which have been set up in North Adams and Concord for this program.

During 1960, work was started on the evaluation of test results which is one of our joint responsibilities with Autonetics. A special management team was established by Sprague to carry out our contractual responsibilities, and we are happy to report that good progress is being made towards achieving the 100 to 1000-fold increase in parts reliability expected of us under this pioneering approach to the reliability of a vital and complex weapons system.

Your Company continues, of course, to supply components for a wide range of other military electronic programs, including such important systems as the VERDAN airborne guidance computer for the Hound Dog air-to-surface missile, the guidance systems of the submarine-fired Polaris, the ship-borne Talos and several other missile systems. We also participate heavily in the production of ground-based electronics for continental defense systems such as BMEWS and SAGE. A contract was awarded during the year to our Interference Control Field Service Department for on-the-spot assistance on the interference susceptibility and electronic system integration for the B58 supersonic bomber.



Concord, New Hampshire Plant

FUTURE PROSPECTS

Actual spending for national defense in the fiscal year ending in June, 1961 will be about \$46.6 billion, an increase of some \$600 million over 1960. Contributing factors include increases in aircraft procurement for the B58 and B70 programs, as well as for strengthening our airborne alert system; a stepup in strategic missile procurement; and increases in construction of Polaris-firing submarines, guided missile frigates, etc. Indications are that the budget for fiscal 1962 will call for still higher defense spending, so that we look to further expansion of the military market for the electronics industry and for Sprague Electric for some years to come.

The outlook for continued growth in our industrial markets is also good, not only in the field of computers for business and industry described earlier, but also in many other applications of electronics. Our nation is indeed fortunate that many of the techniques of electronics which are now being employed in the production of advanced weapons are also directly useful in a world at peace. For example, the entire field of aircraft navigation and communications systems has benefited immeasurably from knowledge gained in military communications, and systems such as VORTAC for air traffic control and airborne weather radar for greater safety in the air, are offshoots of military systems. Another field of growing importance to our industry is medical electronics, where advanced techniques of instrumentation developed for military purposes are being employed to greater advantage. Your Company will continue to work with the major producers in this field on the development of component parts to meet their needs.

OUR CONSUMER MARKET

The market for electronics in the home also contributed to the higher end-product volume of the industry in 1960. Dollar value of home entertainment

electronics increased to \$1.9 billion from \$1.7 billion in 1959, reflecting the largest percentage of high-end sets such as consoles and combinations since 1953. However, there were sharp fluctuations in production of television sets, because the rate of output maintained in the first six months proved to be in excess of retail sales. For the year as a whole, retail sales amounted to 5,945,000 sets compared to 5,749,000 the previous year. Set production also ran ahead of 1959 in the early months, but was sharply curtailed in the second half after factory stocks reached the highest level in three years. Total production (excluding those made for export) came to 5,542,000 against 6,161,000 in 1959. By year end, total inventories of sets had been cut to 1,759,000 from 2,162,000 a year earlier, and were not excessive in relation to the current rate of sales.

In contrast to the lower production of television sets, 1960 radio production increased from 15,408,000 to 16,917,000 (excluding sets made for export). Both home and auto radios were in excellent demand, with retail sales of home sets ahead of 1959 in every month of the year but one. Separate phonographs also had a good year, reflecting the same tendency on the part of the consumer to upgrade the quality of his purchases that characterized the radio-TV market.

The outlook for entertainment electronics in 1961 is certainly far from clear. Uncertainties in the minds of consumers created by rising unemployment and falling hours of work may result in a cautious attitude toward spending for durable goods, though recent surveys suggest that the extent of this influence is surprisingly small so far. Moreover, personal income is running only 1% below 1960's all-time high. Much will depend, of course, on the rapidity and extent of any recovery in general business during the year, but we believe it is realistic to assume a modest decline in the value of consumer shipments to a level slightly below that of 1959.

Continued from Page 5

problem of sales to countries which had remained outside EEC after the French-English split. These seven countries - Austria, Denmark, Norway, Portugal, Sweden, Switzerland, and the United Kingdom (England) had formed their own union known as the European Free Trade Area or EFTA, and they also represented a large potential market for Sprague Electric.

In 1960, after long negotiations, we concluded an arrangement with the Telegraph Condenser Co., Ltd. of England. Under the terms of this arrangement we obtained a substantial interest in T. C. C. and an agreement for an exchange of technical information between the two countries. T. C. C., besides its factories in the United Kingdom, also has affiliates and/or subsidiaries in Australia and Canada and a manufacturing arrangement in Spain. Under the able direction of Mr. Percy Sporing, its Managing Director, T. C. C. has become the leading capacitor manufacturer in the United Kingdom.

Another step was taken in the European Free Trade area in January 1961 with the establishment of Sprague Electromag S/A in Belgium. Under the management of Mr. Norton Cushman of the Special Products Division, this factory will produce magnetic components for the fast growing market for these products in Europe.

As a by-product of our decision to start this operation, the Special Products Division in North Adams has already received very substantial orders for shipment to European customers. While some of this business will later accrue to local production in Belgium, we definitely expect that the Special Products Division will continue to receive substantial business as a result of the existence of the Belgium Plant.

No story of our European operations would be complete without a mention of the field engineering services which are provided through a central office in Zurich, Switzerland. Originally organized in 1956 as Sprague Europa, a Liechtenstein Corporation, it was re-

named Sprague World Trade Corporation in 1957. This company is managed by Mr. Peter Kraehenbuehl and handles sales of Sprague Electric goods everywhere in the world outside of the Western Hemisphere (which is handled by Sprague International) and also all sales of Sprague-CREAS goods outside of Italy.

The decision to give field engineering service to our customers and sales representatives by men trained at Sprague and knowing Sprague components was a good one. Sales, particularly of our U. S.-made products, have increased greatly and the company has prospered to the extent that it has now become necessary to enlarge the engineering staff working out of Zurich.

While plans were progressing so favorably in Europe, other areas of the world were not being neglected. In 1958, a survey was made of Far East potentialities. After a thorough study, it was decided to locate our own factory in Hong Kong, and it is expected that it will be in full production by the end of this year. Hong Kong will service the Far East, India, Australia, South Africa and possibly parts of Latin America. Initially, production will be limited to electrolytic capacitors. Subsequently, the range may be expanded. Mr. Rudolph Lederhofer, who has had extensive residence and experience in the Far East, is in charge. He and his associates have undergone extensive training at North Adams and elsewhere in the United States. The story of our operations in the Far East is just beginning, but it is sure to be an interesting, and we hope, a successful one. However, like our other foreign programs, it has been carefully tailored to supply a specific market or markets, and following a long established policy of Sprague Electric, no imports into the United States of products of this or any other foreign based plant are contemplated.

At the present time another operation outside of the United States is being established in Alpuyecá, Mexico for the production of electrolytic capacitors. Known as Sprague-Mexicana S. A., the company will be managed by Humberto



R. LEDERHOFER

H. UQUILLAS

Uquillas, for many years our representative for sales of PFC capacitors in Mexico. Mexican engineers have been trained in Sprague factories and it is hoped that, in addition to sales in Mexico, the company will also be able to export to certain Central American and possibly also to South American markets.

There is still considerable export business originating in the United States and also abroad, which for one reason or another cannot be handled by Sprague International or Sprague World Trade. Overseas Operations takes care of all of this business and, in general, acts as a catalyst on behalf of Sprague Electric for all foreign operations.

Basically speaking, this is the story of our operations to date. The success of our foreign ventures is, and will continue to be, due in a large part to the dedicated staff who work tirelessly and intelligently in North Adams with Mr. Adams. Special credit is due Miss Suzette Lemieux, Mr. Adams' secretary and assistant, and Mr. Kenneth Haskins, Mr. Ferran's assistant, and their associates.

Our overseas business is thriving and further plans are being formulated to make Sprague components available in all the major foreign markets. All of this necessitates a great deal of travel abroad by Mr. Adams not only to supervise existing installations but also to find new markets for our products and develop, by negotiations with governments and customers, a favorable climate in which to sell them.

The continued growth of Sprague Electric is important to each and everyone of us. We can well be proud of our progress both in this country and abroad.

ICFS-Special Report

By DAVID SIMONDS

and DAVID GILMORE

Sprague's Interference Control Field Service Department (ICFS) learned during the latter months of 1960, that schedules affecting the national defense, once established by the Department of Defense, are not easily altered. Perhaps the most significant of these schedules was the one affecting our ultimate ability to retaliate within minutes for any missile attack which might be launched against us. The nation's hopes had been invested in the Minuteman.

A missile which must be fired within minutes of an alert cannot be allowed the luxury of a meticulous and lengthy countdown. The missile, once housed in its launching silo, must be ready for instant employment. This requires the utmost confidence that the electronic gear is in condition to function faultlessly.

An important segment of this calibration capability was delivered to Sprague's ICFS Department in early November for a series of tests intended to determine whether or not it was in compliance with the specialized radio interference specification applicable to it. The cart in which this precision equipment was housed was officially known as the Mobile Telemetry Calibration Cart. It weighed about one ton and was typical in appearance of the ground support equipment which is wheeled onto air fields and launching sites for the purpose of research checkout. The Cart was manufactured in Tulsa, Oklahoma, by Century Electronics and Equipment Company.

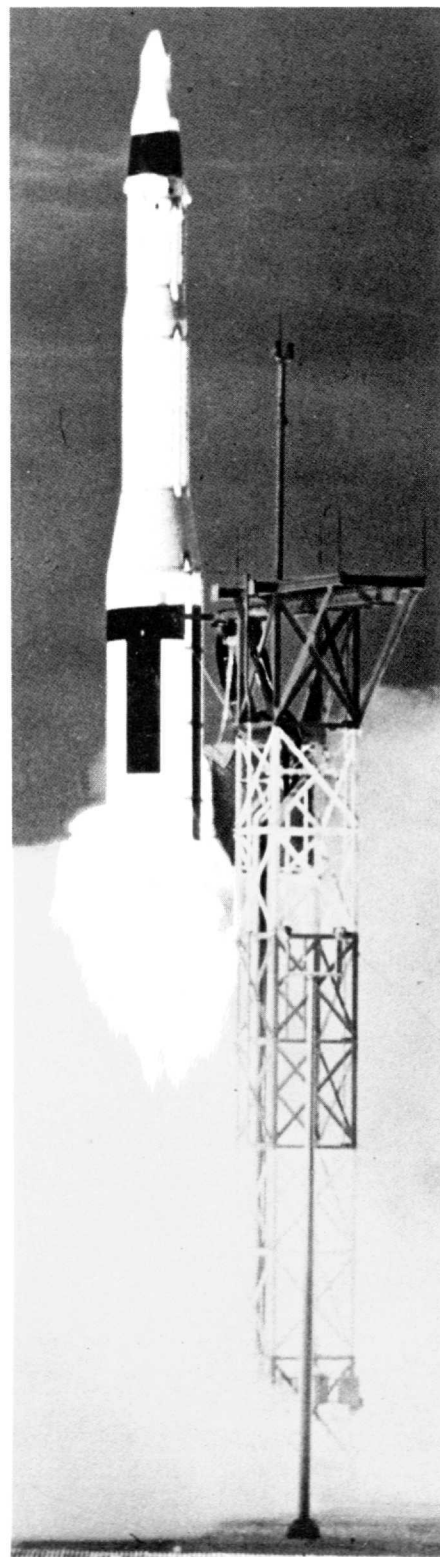
The Sprague Electric ICFS Department was chosen by the Boeing Airplane Company to achieve, on a crash program basis, the electromagnetic compatibility design review necessary to accomplish the modifications required to comply with the newly enforced radio interference limits for the overall Minuteman Program. The Sprague Electric ICFS Department is the only agency in the United States which has developed

Radio Interference Control prediction technique to the point where it is a usable tool during the drafting portion of equipment design effort.

The Telemetry Calibration Charts had been delivered to the Atlantic Missile Range, Cape Canaveral and were found to be electromagnetically incompatible with other equipment in the area. The Cart was delivered from the Cape to the Sprague ICFS Lab, North Adams. Personnel from the Dayton and Los Angeles ICFS Labs were brought to North Adams to assist on the program.

Working on a top priority basis, and with the full cooperation of Century Electronics and Equipment Company and the Boeing Airplane Company, around the clock schedules were immediately established. While initial tests were in progress, the interference control engineers of the ICFS Department were conducting a thorough design review so that, upon completion of the initial survey test, the necessary modifications were already determined. For five weeks, twenty-four hours a day, the work continued. Design and drafting facilities of the ICFS Department were put to work modifying existing drawings and drafting new ones. Components were relocated and suppression devices installed. Sprague technicians and technicians from Century performed the necessary rewiring. Sprague interference control engineers, Boeing engineers and Century engineers, working on twelve hour shifts, were in constant attendance. Finally, a complete modification of the cart was achieved and a final, detailed test completed.

Statistics are of less importance than is the fact that a functioning and compatible Cart was made available, on schedule for future use on the Minuteman Program. What is significant is the effort applied by Sprague Electric Company's ICFS Department, and the success achieved.





JOB STABILITY

*Everybody wants it, but how do you
get it . . . and keep it?*

There's hardly a man alive who doesn't want steady, stable work. In these unpredictable days, Job Stability has been on almost everybody's mind. Competition is tougher, customers are choosier, sales are harder to come by . . . it has become a real bare-knuckled fight to compete successfully. In times like these, every man must look at his job and ask himself, How can I make it more secure? Job stability is one of the things in this world you can't **buy**. You won't get it as a **gift**. Some might try to build an iron cage of "guarantees" around it, but the "guarantees" fade away if there's suddenly no work left to be done. Job stability is like anything else that's really worth something . . . it has to be **earned**. It has to be earned and won from the only source that has the power to grant it . . . the **customer**. His confidence in us, his continuing orders for our products, is the only assurance we have that our paychecks will keep rolling along. Creating job stability, then, is nothing more than basically **getting and holding more customers**. To do this, we have to out-compete our competitors in giving the customer what **he wants**. His demands are simple enough: the customer wants a **low-priced** product, of the highest **quality**, and provided with prompt, efficient and courteous Service. The company that can do the **best** job in answering all three of these demands - Cost, Quality and Service - will have all the business and provide all the jobs it can handle. How can you make your job more secure and stable? By simply doing your best to help give our customers these three things they want most. Can you find ways in your job to cut costs? (This can range all the way from turning off an unneeded light bulb to the prevention of damaged goods and rejects.) No matter what your job, can you find ways to help improve and insure the quality of your products? Can you find ways to give your customers better service? There is no such thing as absolute "security". But you, as an individual, can do much to improve your own job **stability** by helping Sprague Electric to compete better, to attract and hold more customers, to boost that all-important order volume. Out-compete competition with your three weapons of . . . Cost control, Quality work, and Service second to none. There is no better insurance for your future **JOB STABILITY**.

Adapted from THE CELOTEXER, The Celotex Corp.